HMAS Sydney

Written by Cherub Log from material provided by PO RE Gordon Wood

Gordon Wood was one of the first Radio Mechanics to graduate from the Adelaide School of Mines RAN training program in August 1946. Following advanced training at HMAS *Watson,* Gordon later was a student at HMS *Collingwood* and HMS *Mercury* in the UK for all of May and June 1947, training to be part of the crew of Australia's aircraft carrier acquisition, HMAS *Sydney*. It was here he studied Radar types 262, 276, 277, 293Q and 960, as well as type 242M Interrogator. What follows are some verbatim extracts taken from Gordon's hand written course notes.

The A276 has been designed as a high power surface and air warning set operating on the "S" band (3,000 Mcs). It operates from 220 volt DC mains and is complete with its own motor alternator unit which supplies 180 volts 500 cycles. Peak power is 400 Kw, PRF is 500 cps, pulse length is 1.0 µsecond. The display equipment is 1 "A" scan and up to 3 PPIs. The "A" scan ranges are 35,000 and 140,000 yards.

The transmitter employs a magnetron type AV16 as Tx valve and is provided with a waveguide output. The aerial consists of a sliced parabaloidal fitted with waveguide horn feed. The aerial is capable of 3 modes of operation. One is continuous rotation in either direction at speeds of up to 10 rpm. A second is manual training with gyro stabilisation in azimuth of the true bearing. The third is a sector of variable width between approximately 10º and 80º with gyro stabilisation in azimuth of the mean bearing of the sector.

The Type AUJ aerial has narrow horizontal beam and moderately wide vertical beam. Hand driven in both directions or continuous in one direction. Stabilised in azimuth, ie when rotating it does so at constant angular speed relative to the space around the ship regardless of the ship turning or stopping, or if stoppped on a particular bearing it will be kept on that compass bearing, Because of the moderately wide vertical beam, vertical stabilisation is not necessary.

The 293. Aerial type AUR. Similar to 276 and designed as target indicator to detect high flying aircraft. Efficiency in horizontal plane not as good as 276.

The 277. Aerial type AUK. Narrow beam in both planes and moves vertically as well as in azimuth. Can be rotated at power at variable speeds in either direction. Stabilised in azimuth and vertical plane enabling angle of sight of aircraft to be found using HPI or by controlling the vertical movement for maximum echo on the normal scan and reading aerial elevation. An interrogator 242 forms part of the equipment. There are 3 types of indicators, the PPI, HPI and TPI. The TPI is a normal type of PPI but has cursors projected optically on to the screen so that target bearings may be transmitted away to gun control positions or otherRadar sets.

The Range Transmission Unit (RTU52) is fitted and enables the range of an echo indicated on the normal scan to be passed to various parts of the ship by lining up a bright spot on the scan with the echo.

The Sector Selector Unit and panel can observe on the normal scan all echos in a chosen arc of bearing whilst the aerial rotates continuously. Echos brighten when the aerial passes through the bearing.

The 293Q. 10 cms. Identical to the 277Q except for aerial and aerial control unit. This has a cheese type aerial tilted to give close range surface cover and air cover up to 35,000 feet. Used as target indicator set but provides all round low and medium air and surface warning when 277 is height finding. 293Q differs from 293P in having a larger cheese aerial.

277Q 10 cms. Warning of low flying and surface craft. Also accurate height finding.

The 262 was designed for control of close range weapons, and supercedes the 282. The STAGG (Stabilised Tachymetric Anti Aircraft Guns) was the first type of 262 and consists of Bofors in a twin 40 mm mounting having the Radar set mounted in cubicles on the gun platform. CRBFD

(Close Range Blind Fire Detector) is similar to STAGG but having its Radar set in cubicles and the tach box mounted in a director with a completely separate gun platform. The director contains a dome analyser (dummy gun). Present policy is to control one Bofors mounting with one director

Frequency is 10,000 Mcs. PRF is 1,500.Pulse length is 0.5µsecond. Maximum range to lock on to a twin engine aircraft is 7,000 yards.

To give a feel for the complexity of the 262 circuitry, what follows is a summary list of the major sub assemblies:

Long Tailed Pair. Used mainly as a signal amplifier, the objective being to obtain a balanced outut from unbalanced input.
Differential Amplifier. Objective is to obtain high amplification from nay slight difference in the input potential to the grids.
Resistance Modulator. Purpose is to produce an AC voltage of fixed frequency and whose amplitude depends on the amplitude of applied DC.
Miller Retainer, Miller Transitron, Resonant Charger,Range Sawtooth Generator, Strobe Firing Flip Flop. These were all special circuits designed to give particular wave forms such as square waves and saw tooth waves.

Some of the special circuits and units were:

Modulator, Triggering Valve, Switching Valve,Head Amplifier with AFC (Automatic Frequency Control), Differential Detector, Radiation Meter, Strobe Amplifier, X.C.O Magslip, T.B.I System, Radial Line Producer, Strobe Positioning Circuits, Strobe Generators, Range Voltage Generator, Signal Measuring Strobe Rectifier, Locking Flip Flop, Suippression Delay Line, Rate Memory Circuit, Magnetic Brake Circuitry, Servo Unit, Limiter Unit, Phase Discriminators

The Rectifier Unit was designed to provide different high tension DC voltages for operation of various units. The initial supply to the rectifier was 80 volts 500 cps, and the DC outputs were +500volts, +300 volts, +200 volts, -150 volts and -2,250 volts.